**Culminating Activity**

**Let There Be Light**

**Objectives**

This is an activity designed to be the replacement for a grade 8 optics unit test. This project should:

1. Exhibit a student’s understanding of optics with a detailed description of what properties are being observed and why they occur
2. Cover at least 2 of the 4 PLOs described by the B.C. Grade 8 Science IRP for Optics
3. Push students to delve deeper into the topic due to an personal engagement with a particular topic
4. Experience a more professional activity through the use of a science fair in the final assessment
5. Collaborate on a final product which they will present to their peers as a means for assessment
6. Improve their abilities as a self and peer reviewer
7. Give the students more ownership of their education by allowing them to choose the method by which a final assessment of their understanding is made

**\*** note that more careful assessment will be required throughout the unit to determine each student’s learning of each outcome.

**Grade Level**

Grade 8

**PLOs**

Physical Science: Optics

**C1** – Demonstrate knowledge of the behavior of waves

**C2** – Explain the properties of visible light

**C3** – Compare visible light to other types of electromagnetic radiation

**C4** – Explain how human vision works

**Previous Knowledge**

It is expected that this activity is the culmination of the optics unit, so all PLOs listed as covered by the activity are also the PLOs expected for previous knowledge.

**Expected Schedule**

With all required components, it is suggested that you allow 3 class periods for research and development, 1 period for the science fair and 1 period for a self-assessment meeting (during which students can begin working independently on the next unit).

**Materials**

Due to the openness of the activity, materials will be on a case-by-case basis, however there are a few items that will be universal for all students:

* Science fair display board (1 per group)
* Projector (for students who need it for their presentation)
* Science fair package (including judging criteria)
* Student handout (with assessment rubric)

**Safety Concerns**

As a teacher it is important that you are aware of what each group is doing in order to assess the possible dangers associated with it. It is a good idea to make their parents aware of the project so they can make sure any work done at home is done with care and safety in mind.

**Guiding Questions**

Based on our objectives, there are a number of questions that could arise. A few possibilities are:

1. How do the theories covered in class impact the world around us?
2. How does the human eye relate to optics technologies like telescopes and microscopes?
3. What do the different electromagnetic radiations tell us about the universe?
4. How can optics be used in the advancement of fields like robotics?

**Instructions**

*Part 1 – Researching*

1. State the nature of the project (give them the provided student handout and explain). Allow the students the opportunity to ask questions about all the different assessments, including the self, peer, and science fair assessment.
2. Book the computer lab or library (if necessary) for at least 2 of the 3 class periods for students to research their topics
3. Have the students get their project idea pre-approved by you before they move on. (at the end of the waves chapter and confirmed at the end of the mirrors and lenses chapter)
4. Remind the students of all the components that are required for the project to be complete:
   1. A written report stating the science behind their project and how it relates to the content we covered in class (see the display handout and group evaluation rubric)
   2. A demonstration or interactive piece that will be the central focus of their science fair set up
   3. A science fair display that includes all of the relevant information in a concise but thorough manner
   4. A presentation that will be performed in front of the class, summarizing their project and the results of it
   5. A self/peer review that indicates the contributions from all members of the group, including the student themselves. The peer review will be written however the self review will be done in a meeting with the teacher

*Part 2 – Presentations*

1. With projects complete, you are now ready to have the students present their work. Have groups set up their displays on table and divide them into two groups. One set of groups present while the other half observes and evaluates, then switch.
2. It is ideal if some of the physics 11 students can also participate as judges. Guest and celebrity judges (like the principal or a local science professor) add ceremony to the event.

*Part 3 – Self/Peer Assessments*

1. Have all students fill out a group assessment form (see student handouts package). Be sure to reiterate the importance of being honest about each member’s contributions to the final product, and that their comments are confidential.
2. Each student interview should be centered on the individual accomplishments of that student. This is the chance for the student to try and suggest the grade they believe they’ve earned in their final project. Be sure to make the students justify their answers with direct evidence to the projects they’ve worked on (e.g. if they claim they worked on a large section, ask them questions about that section). It is important that this not feel like an interrogation, so please make sure the location of these interviews is welcoming and less intimidating. It is also important that, if you feel the student does not warrant the grade they have asked for, that you justify it using the assessment rubric specifically.

**Extensions/Adaptations**

* If you cannot afford the number of classes indicated, create larger groups that can expedite the amount of work each group can get done
* The science fair component can be replaced by a presentation day where the students do a typical presentation with a projector
* The written report could be fashioned into a poster if you feel additional visuals are necessary or perhaps the work load needs to be lightened for your students
* Students who created something truly original should be considered for a regional science fair competition. If this is the case contact your administration and find out about the possibilities behind this